
State of California
The Resources Agency
Department of Water Resources

**Oroville Facilities Relicensing
Environmental Study Reports
Comments and Errata**



JANUARY 2005

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**State of California
The Resources Agency
Department of Water Resources**

**OROVILLE FACILITIES RELICENSING
ENVIRONMENTAL STUDY REPORTS
COMMENTS AND ERRATA**

**Oroville Facilities Relicensing
FERC Project No. 2100**

This report was prepared by

Teodoro Alvarez Sr. Engineer, WR

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REPORT SUMMARY

This document serves as an accompaniment to the Environmental Study Reports and is intended as a means to distribute any written comments received and resulting corrections, where appropriate, for various study reports. Most of the reports that were generated did not receive any written comments. This include the reports for study plans SP-F3.1, SP-F3.2, SP-F8, SP-F10 SP-F16, SP-F21, SP-T1, SP-T2, SP-T3/5, SP-T4, SP-T6, SP-T7, SP-T8, SP-T10, SP-T11, SP-G1, SP-G2, SP-W2, SP-W3, SP-W5, SP-W6, SP-W7 and SP-W9.

Each report that did receive comments has its own section in this document. Errata tables, if appropriate, were generated and follow the comments section for each report. The errata tables specify the location within the report (Section) and page number of the error and the correction to the error.

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TABLE OF CONTENTS

REPORT SUMMARY	RS-I
1.0 INTRODUCTION.....	1-1
2.0 SP-F1 – EVALUATION OF PROJECT EFFECTS ON NON-FISH AQUATIC RESOURCES	2-1
2.1 Comments Received via E-mail from Bob Baiocchi to Terry Mills, September 30, 2004	2-1
2.2 Disposition of Comments to SP-F1	2-4
3.0 SP-F2 – EVALUATION OF PROJECT EFFECTS ON FISH DISEASES	3-1
3.1 Comments Recived via E-mail from Tresa Veek to Terry Mills, July 22, 2004.....	3-1
3.2 Comments Received via E-mail from Tresa Veek to Terry Mills, July 27, 2004.....	3-3
3.3 Disposition of Comments to SP-F2.....	3-3
4.0 SP-F5/7 – EVALUATION OF FISHERIES MANAGEMENT ON PROJECT FISHERIES.....	4-1
4.1 Comments Received via E-mail from Eric Theiss to Terry Mills, July 22, 2004.....	4-1
4.2 Disposition of Comments to SP-F5/7	4-2
5.0 SP-F9 – EVALUATION OF THE FEATHER RIVER HATCHERY EFFECTS ON NATURALLY SPAWNING SALMONIDS.....	5-1
5.1 Comments Received via E-mail from Bob Baiocchi to Terry Mills, September 30, 2004	5-1
5.2 Disposition of Comments to SP-F9.....	5-2
6.0 SP-F15 – EVALUATION OF THE FEASIBILITY TO PROVIDE PASSAGE FOR TARGETED SPECIES OF MIGRATORY AND ANADROMOUS FISH PAST OROVILLE FACILITY DAMS	6-1
6.1 Comments Received via E-mail from Eric Theiss to Terry Mills, July 22, 2004.....	6-1
6.2 Disposition of Comments to SP-F15.....	6-8
7.0 SP-W1 – PROJECT EFFECTS ON WATER QUALITY DESIGNATED BENEFICIAL USES FOR SURFACE WATERS.....	7-1
7.1 Comments Received via E-mail from Bob Baiocchi to Terry Mills, September 30, 2004	7-1
7.2 Disposition of Comments to SP-W1	7-1

8.0	SP-T9 – RECREATION AND WILDLIFE.....	8-1
8.1	Comments Received via E-mail from Brad Corkin to Terry Mills, July 12, 2004	8-1
8.2	Disposition of Comments to SP-T9.....	8-3

LIST OF TABLES

Table 3.0-1. Errata to SP-F2 (<i>DRAFT FINAL</i>), dated June 2004.	3-3
Table 5.2-2. Fish pathogens and diseases detected at Sacramento River basin hatcheries, 1991-2000. (Revised)	3-6
Table 5.4-1 Attributes of non-actively managed fish diseases that are known to be present in the study area. Information from Noga (2000), Woo (1995), Woo and Bruno (1999), Plumb (2002), Mendoza et al. (2002), Pers. comm. Dr. Bill Cox (DFG 2003). (Revised)	3-8

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1.0 INTRODUCTION

The California Department of Water Resources (DWR) operates the Oroville Facilities, a multipurpose water supply, flood management, power generation, fish and wildlife enhancement and recreation project. The hydroelectric facilities operate under a license from the Federal Energy Regulatory Commission (FERC), which expires on January 31, 2007. Pursuant to the Federal Power Act, DWR is required to file an application for a new license on or before January 31, 2005.

During the course of the relicensing process, various reports were produced on topics that were outlined by the Environmental Work Group. These reports were produced between June 2002 and December 2004. All but five of these documents have been released to the public via the Work Group. The remaining five are available via the relicensing web site.

This document contains all of the comments received by DWR on the environmental study reports. Most of the reports that were generated did not receive any written comments. This include the reports for study plans SP-F3.1, SP-F3.2, SP-F8, SP-F10, SP-F16, SP-F21, SP-T1, SP-T2, SP-T3/5, SP-T4, SP-T6, SP-T7, SP-T8, SP-T10, SP-T11, SP-G1, SP-G2, SP-W2, SP-W3, SP-W5, SP-W6, SP-W7 and SP-W9. Each report that did receive comments has its own section in this document. Errata tables, if appropriate, were generated and follow the comments section for each report. The errata tables specify the location within the report (Section) and page number of the error and the correction to the error.

This document serves as an accompaniment to the environmental study reports and is intended as a means to distribute any written comments received and resulting corrections where appropriate on the various study reports and should be referred to when reading the study reports.

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2.0 SP-F1 – EVALUATION OF PROJECT EFFECTS ON NON-FISH AQUATIC RESOURCES

2.1 COMMENTS RECEIVED VIA E-MAIL FROM BOB BAIOCCHI TO TERRY MILLS, SEPTEMBER 30, 2004

September 30, 2004
Mr. Terry Mills
Environmental Program Manager 1
Division of Environmental Services
California Department of Water Resources

Re: Environmental Work Group Meeting; September 29, 2004; Oroville, California
Comments by the Baiocchi Family

Via E-Mail

Dear Mr. Mills:

At the Environmental Work Group Meeting you advised all parties that they had 30 days (or less, depending on the DWR service date) to submit written comments regarding Study Plans that were discussed at the meeting. You also advised the parties that at least one Plan was issued on or about September 28, 2004. The NOAA Fisheries objected to the short notice period (one day) and raised questions about DWR's protocol when requesting written comments from federal agencies and other parties. Bob Baiocchi attended the meeting representing the Baiocchi Family. The following are the comments of the Baiocchi Family:

Project Effects on Water Quality Designated Beneficial Uses for Surface Water; Study Plan W1

Before we can determine whether the many statements in the document are valid and also are in accordance with federal and state statutes and regulations, we must read the comments of NOAA Fisheries. NOAA Fisheries has a duty and responsibility to protect threatened and endangered spring-run salmon and steelhead trout species in the relicensing of the Oroville Project. Also NOAA Fisheries has a duty and responsibility to comply with the provisions of the US Fish and Wildlife Coordination Act. NOAA Fisheries must be given sufficient time by the licensee (DWR) to submit comments on the subject plan.

Once we read the comments of NOAA Fisheries, we request the opportunity to comment on said Plan under the public due process rights which is guaranteed under the US Constitution.

We reference Project Effects On Water Quality Designated Beneficial Uses For Surface Water; Study Plan W1; Oroville Facilities Relicensing; FERC Project 2100; Draft Final Report; September 2004; Prepared by Department of Water Resources.

Draft Final Report on the Evaluation of Project Effects on Non-Fish Aquatic Resources (SP-F1, Tasks 1 & 2)

Before we can determine whether the many statements in the document are valid and also are in accordance with federal and state statutes and regulations, we must read the comments of NOAA Fisheries. NOAA Fisheries has a duty and responsibility to protect threatened and endangered spring-run salmon and steelhead trout species in the relicensing of the Oroville Project. Also NOAA Fisheries has a duty and responsibility to comply with the provisions of the US Fish and Wildlife Coordination Act. NOAA Fisheries must be given sufficient time by the licensee (DWR) to submit comments on the subject plan.

Once we read the comments of NOAA Fisheries, we request the opportunity to comment on said Plan under the public due process rights which is guaranteed under the US Constitution.

We reference Draft Final Report on the Evaluation of Project Effects on Non-Fish Aquatic Resources (SP-F1, Tasks 1 & 2); Oroville Facilities Relicensing; FERC Project 2100; Draft Final Report; August 2004; Prepared by Department of Water Resources.

Feather River Salmon and Steelhead Fish Hatchery Report – Randy Brown

Randy Brown is preparing a report for CDWR on the Feather River Salmon and Steelhead Fish Hatchery (aka Feather River Hatchery). At the subject meeting Mr. Brown stated that the report will be completed next week. Mr. Mills stated that following the completion of the report by Mr. Brown, it must be reviewed by staff members of DWR.

The subject Feather River Hatchery Report must be subject to comments by NOAA Fisheries and other parties, with a review period of at least 45 days.

Please forward a copy of said report by e-mail and also first class mail (hard copy) to me so that we will be able to submit written comments.

We reference the verbal representation by Randy Brown regarding the Feather River Salmon and Steelhead Fish Hatchery Report at the subject meeting.

Annual Fishery Agreement between NOAA Fisheries, Department of Water Resources, and Department of Water Resources

Please forward to me a copy of said annual 2004 fishery agreement (existing license) between NOAA Fisheries, Department of Water Resources, and Department of Water Resources.

Post Project Relicensing Fishery Agreement between NOAA Fisheries, Department of Water Resources, and Department of Water Resources

At the subject meeting a representative of the Department of Fish and Game advised the parties that I voted against the Post Project Relicensing Fishery Agreement between NOAA Fisheries, Department of Water Resources, and Department of Water Resources. I advised the parties that I have not reviewed said agreement.

I have reviewed my files and could not find a copy of said post project fishery agreement between the parties. I find it hard to believe that NOAA fisheries has developed a draft post project agreement without yet submitting recommendations to FERC and DWR. In my opinion, an agreement is a document that spells out the language (shall, will, may) and the duties and responsibilities of the parties.

Please forward a copy of said post project fishery agreement to me for our comments.

Other Items Discussed at the Subject Meeting of September 29, 2004

We are not in agreement with many of the potential DWR “fixes” for many of the problems that exist at the Oroville Project that were discussed at the subject meeting. Some of those are:

Water Quality Problem at the Feather River Hatchery (HV Matter)

Cold Water Fishery Management of Oroville Reservoir (aka Lake Oroville)

Existing and Proposed Water Temperatures Requirements (Low Flow – High Flow Areas) – Fish and Other Aquatic Species

There was not enough time at the subject meeting to discuss the above items in detail nor was a significant amount of information provided by DWR and their consultants.

That concludes our comments for now. Please place these comments into the records and provide copies to the parties that attended the meeting on September 29, 2004, including other parties that did not attend the subject meeting, but are part of the environmental process.

Respectfully Submitted

Bob Baiocchi, Agent
The Baiocchi Family
P.O. Box 1790
Blairsden, CA 96103

cc: Other Parties Via E-Mail

2.2 DISPOSITION OF COMMENTS TO SP-F1

The comments have been noted; no additional edits to this report are deemed necessary.

3.0 SP-F2 – EVALUATION OF PROJECT EFFECTS ON FISH DISEASES

3.1 COMMENTS RECIVED VIA E-MAIL FROM TRESA VEEK TO TERRY MILLS, JULY 22, 2004

SP-F2 Draft Report Comments

Page 1-2 end of paragraph: disease Infectious Hematopoietic Necrosis should not be italicized.

Page 5-4: no need for the word “California” after Feather River at the end of the second paragraph

Page 5-5, Table 5.2-1: pathogen misspellings – *Myxobolus cerebralis* and *Flavobacterium columnare*

Table 5.2-2: *Serratia liquefaciens*, *Ichthyobodo necator*, *Ichthyophthirius multifiliis*, *Ambiphrya*, *Trichophrya*, and *Chilodonella* misspelled; *Flavobacterium phsychrophilum* is found at FRH on a fairly regular basis, and *Yersinia ruckeri* has been found at Thermalito, but not FRH ; *Saprolegnia*, *Ambiphrya*, *Chilodonella*, and *Epistylis* are found at Thermalito; *Ambiphrya* has been found at Crystal Lake.

Page 5-9: First paragraph of section 5.3.1 three sentences from the end - the freshwater polychaete scientific name should not be in parenthesis or “the” should be changed to “a”.

Page 5-11: First sentence – should be “at high levels (plural) of pathogens, mortality could be 100% regardless of temperature”. Second sentence – “salinity can prevent infection at concentrations (plural) greater than 15 ppt”.

Page 5-12: Last sentence – temperature control at FRH and UV water treatment are used to minimize C. shasta infections. The hatchery doesn’t have the capability to warm the water to >60°F for management of IHN, nor the UV capacity to treat all the incoming water for IHN. Last half of sentence should be “well water for Thermalito Annex which provides warmer water temperatures to control IHN outbreaks”.

Page 5-13: Section 5.3.3 first paragraph second sentence – the parenthesis should be removed form *Tubifex tubifex* or wording changed to an aquatic oligochaete; next sentence “infectivity” should be changed to “infective stages”. Second paragraph *M. cerebralis* and first triactinomyxon is misspelled and this word should not be capitalized or italicized as it is a life-stage and not a genus name; Fifth sentence “after the mature triactinomyxon develop (no “s” on the end) they are released into the water column for a period of several weeks up to two years (no parenthesis). Sixth sentence should include gills as an entry point for the parasite.

Page 5-14: Second paragraph under Methods of Control last sentence suggests that the State only restricts positive out-of-state growers. A better way to say this would be that the disease is “managed indirectly by DFG by restricting fish planting from known positive growers”.

Page 5-15: Section 5.3.5 last sentence under Causative Agent should read Coho salmon and steelhead are the most susceptible species. Last paragraph *F. psychrophilum* is misspelled.

Page 5-16: Under Methods of Control for Cold Water Disease – temperature is not used as a method of control (it does just fine at 60°F) – antibiotics and copper sulfate are the main therapeutants.

Page 5-17: Last paragraph *Flexibacter columnaris* has been changed to *Flavobacterium columnare*.

Page 5-18: Under Methods of Control surfactant is misspelled. Last sentence – water temperature is not used to control columnaris – antibiotics, copper sulfate, and permanganate are used. Under Environmental Conditions.....there should be a citation after the last sentence.

Table 5.4-1: Species affected by furunculosis is confusing – Atlantic salmon is most susceptible salmonid and rainbow trout the least susceptible salmonid, the other species listed are all susceptible. For Environmental Conditions Favorable to Disease under Ich *Ichthyophthirius multifiliis* is misspelled. Species affected by *Epistylis* should include salmonids and scales should be included as an attachment point. Also, *Epistylis* does not go systemic, but the bacteria associated with it can; and formalin, potassium permanganate, and hydrogen peroxide baths are all effective treatments. IPN not found in study area.

Page 6-1: Last paragraph – the hatchery does not compensate for loss of spawning habitat for rainbow trout.

Page 6-2: Bullet #5 should also include steelhead eggs.

Page 6-6: Table 6.3-1 - IPN should not be included in this table (not present in study area). *Ichthyophthirius multifiliis* misspelled.

Prepared by:
Tresa Veek
Associate Fish Pathologist
California Department of Fish and Game

3.2 COMMENTS RECEIVED VIA E-MAIL FROM TRESA VEEK TO TERRY MILLS, JULY 27, 2004

Hey Terry, Anna and I found one other discrepancy in the report that you need to know about. On page 6-2 in the main paragraph it states that the recent period of IHN outbreaks at the hatchery began in 2000, but they actually began in 1998.

Tresa

3.3 DISPOSITION OF COMMENTS TO SP-F2

An errata table has been generated and is included below (Table 3.0-1). Some comments required significant changes to some of the tables in the report and those tables have been revised and are also include below:

Table 3.0-1. Errata to SP-F2 (DRAFT FINAL), dated June 2004.

Report Section	Page	Change
Section 1.0	1-2	Page 1-2 end of paragraph: disease Infectious Hematopoietic Necrosis should not be italicized.
Section 5.0	5-4	no need for the word "California" after Feather River at the end of the second paragraph
Table 5.2-1	5-5	Pathogen misspellings – change "Myxobolus cerebralis" to "Myxobolus cerebralis" and "Flexibacter columnaris" to "Flavobacterium columnare"
Table 5.2-2	5-6, 5-7	Replace Table 5.2-2 with the revised table below: cells that have been revised are highlighted.
Section 5.3.1	5-9	Change "(<i>Manayunkia speciosa</i>)" to " <i>Manayunkia speciosa</i> "
Section 5.3.1	5-11	On the second line change "level" to "levels" and on the forth line change "concentration" to "concentrations"
Section 5.3.2	5-12	Change the last sentence from "The FRH has successfully operated for years in the presence of IHN virus by using iodophore disinfection of eggs, temperature control and ultraviolet water treatment at the FRH, well water for the Thermalito Annex, and warmer water temperatures to control IHN outbreaks (pers. comm., Cox 2003)." to "The FRH has successfully operated for years in the presence of IHN virus by using iodophore disinfection of eggs, ultraviolet water treatment to some of the raceways, and temperature control using the warmer well water at the Thermalito Annex facility (pers. comm., Cox 2003)."
Section 5.3.3	5-13	Change "(<i>Tubifex tubifex</i>)" to " <i>Tubifex tubifex</i> "
Section 5.3.3	5-13	Change "infectivity" to "infective stages"
Section 5.3.3	5-13	Change " <i>M. cererbralis</i> " to " <i>M. cerebralis</i> "
Section 5.3.3	5-13	Change " <i>Triactiomyxon</i> " to "triacinomyxon" and remove the italics

Table 3.0-1. Errata to SP-F2 (DRAFT FINAL), dated June 2004.

Report Section	Page	Change
Section 5.3.3	5-13	Change the sentence "After the mature <i>Triactinomyxon</i> develops they are released into the water column from several weeks (up to two years) (Gilbert and Granath 2001)." to "After the mature <i>Triactinomyxon</i> develop they are released into the water column from several weeks up to two years (Gilbert and Granath 2001)."
Section 5.3.3	5-13	Change the sentence "The <i>Triactinomyxon</i> stage enters susceptible fish through the epithelial cells of the skin, fins, buccal cavity, upper esophagus, and lining of the digestive tract. Actinospores inject sporoplasms under the epithelium." to "The <i>Triactinomyxon</i> stage enters susceptible fish through the epithelial cells of the skin, fins, buccal cavity, gills, upper esophagus, and lining of the digestive tract. Actinospores inject sporoplasms under the epithelium."
Section 5.3.3	5-14	Change the sentence "Whirling disease is managed indirectly by DFG by not planting fish from certain out-of-state growers that have whirling disease problems (pers. comm., Cox 2003)." to "Whirling disease is managed indirectly by DFG by restricting fish planting from known positive growers".
Section 5.3.5	5-16	Change the sentence "Coho salmon and steelhead are most susceptible species, but other salmonid species can be infected or act as carriers of this diseases (Noga 2000)." to "Coho salmon and steelhead are the most susceptible species, but other salmonid species can be infected or act as carriers of this diseases (Noga 2000)."
Section 5.3.5	5-16	Change the sentence "Antibiotic treatments and water temperature control are used to control cold water disease outbreaks at the FRH and Thermalito Annex facilities." to "Antibiotic treatments are used to control cold water disease outbreaks at the FRH and Thermalito Annex facilities."
Section 5.3.7	5-17	Change " <i>Flexibacter columnaris</i> " to "Flavobacterium columnare"
Section 5.3.7	5-18	Change "surfacant" to "surfactant"
Section 5.3.7	5-18	Change the sentence "Antibiotics and water temperature control are used to control columnaris at the Thermalito and FRH facilities." to "At the FRH antibiotics, copper sulfate, and permanganate are used to control columnaris."
Table 5.4-1	5-19, 5-20	Replace Table 5.4-1 with the revised table below: cells that have been revised are highlighted.
Section 6.2.1	6-1	Change the sentence "The primary purpose of the hatchery is to compensate for the loss of spawning habitat in the Feather River for two Chinook salmon stocks (the spring and fall runs) and steelhead/rainbow trout." to "The primary purpose of the hatchery is to compensate for the loss of spawning habitat in the Feather River for two Chinook salmon stocks (the spring and fall runs) and steelhead."
6.2.1	6-2	Change bullet 5 from "5. Chinook salmon eggs for the Mokelumne River Fish Facility; and" To "5. Chinook salmon eggs and steelhead eggs for the Mokelumne River Fish Facility; and"
6.2.1	6-2	Change the sentence "The Annex was again used for IHN virus control during the recent period of outbreaks at the FRH, which began in 2000." to "The Annex was again used for IHN virus control during the recent period of outbreaks at the FRH, which began in

Table 3.0-1. Errata to SP-F2 (*DRAFT FINAL*), dated June 2004.

Report Section	Page	Change
		1998.”
Table 6.3-1	6-6	Change “Ichthyophthirious multifilis” to “Ichthyophthirius multifiliis”
Table 6.3-1	6-6	Delete entire row that starts with IPN. IPN is not present in the area.

Table 5.2-2. Fish pathogens and diseases detected at Sacramento River basin hatcheries, 1991-2000. (Revised)

Pathogen/Disease	American River	Nimbus	Thermalito Annex	Feather River	Coleman NFH	Darrah Springs	Crystal Lake	Mt. Shasta
<i>Aeromonas hydrophila</i>	X	X	X	X	X	X	X	X
<i>Aeromonas salmonicida</i>					X			
<i>Aeromonas spp.</i>	X	X	X	X	X	X	X	X
<i>Flavobacterium branchiophilum</i>	X	X	X	X	X	X	X	X
<i>Flavobacterium columnare</i>	X	X	X	X	X	X	X	X
<i>Flavobacterium psychrophilum</i>	X	X	X	X		X	X	X
<i>Myxobacteria spp.</i>	X	X	X	X		X	X	
<i>Pseudomonas fluorescens</i>	X	X	X	X	X	X	X	X
<i>Pseudomonas spp.</i>	X	X	X	X	X	X	X	X
<i>Renibacterium salmoninarum</i>	X	X	X				X	
<i>Serratia liquifaciens</i>	X							
<i>Yersinia ruckeri</i>		X	X			X	X	
Parasites								
<i>Ambiphrya</i>	X	X	X		X		X	
<i>Apiosoma</i>	X	X						
<i>Capriniana (Trichophrya)</i>	X	X	X	X			X	
<i>Ceratomyxa shasta</i>	X	X	X	X			X	
<i>Chilodonella</i>	X	X	X		X		X	
<i>Cryptobia</i>								X
<i>Epistylis</i>	X	X	X	X	X		X	
<i>Gyrodactylus</i>	X	X		X	X	X	X	X
<i>Hexamita</i>	X			X	X	X		
<i>Ichthyobodo necator (costia)</i>	X	X	X	X	X	X	X	X
<i>Ichthyophthirius multifiliis</i>	X	X	X	X	X	X		
<i>Loma</i>	X					X	X	
<i>Nanophytes</i>					X	X		
<i>Nucleospora salmonis</i>	X	X				X		
Rosette agent					X			
<i>Sanguinicola</i>					X	X		
<i>Tetracapsula bryosalmonae</i>	X	X	X					
<i>Trichophrya</i>	X	X				X	X	

Pathogen/Disease	American River	Nimbus	Thermalito Annex	Feather River	Coleman NFH	Darrah Springs	Crystal Lake	Mt. Shasta
Virus								
Cutthroat trout virus (CTV)							X	X
IHN		X	X	X	X			
Paramyxovirus		X		X				
Miscellaneous								
Gas bubble syndrome	X	X		X	X			
Phoma				X	X			
Saprolegnia	X	X	X	X	X	X	X	X

Source: Dr. Bill Cox, 2003

Table 5.4-1 Attributes of non-actively managed fish diseases that are known to be present in the study area. Information from Noga (2000), Woo (1995), Woo and Bruno (1999), Plumb (2002), Mendoza et al. (2002), Pers. comm. Dr. Bill Cox (DFG 2003). (Revised)

Disease (Pathogen)	Organism Attributes	Species Affected	Pathogenesis	Treatment	Environmental Conditions Favorable to Disease
Furunculosis (<i>Aeromonas salmonicida</i>)	bacteria probably an obligate pathogen, may survive up to 3 weeks in water and months in sediments	many diverse fish, Atlantic salmon most susceptible, catfish, bass, carp, chub, dace, sculpin, bull head, rainbow trout resistant	causes typical hemorrhagic septicemia, bacteria disseminate in many tissues	antibiotics, some vaccines available.	high water temperature
Proliferative Kidney Disease (<i>Tetracapsula bryosalmonae</i>)	Amoeboid parasite	rainbow, brown trout, steelhead, Chinook, coho, Atlantic salmon, grayling	primarily targets kidney, causes exophthalmia, anemia, also affects the spleen, liver, muscle, gills	disinfection, avoidance, quarantine, malachite green bath, salt bath	highest mortality at water temperature of 54° to 57°F
White Spot Disease "Ich" (<i>Ichthyophthirius multifiliis</i>)	Protozoan ectoparasite	virtually all freshwater fish, catfish especially vulnerable	targets skin or gills, forms cysts on skin or gill epithelium, can cause ulceration	formalin immersion, 1ppt salinity, therapeutic drugs	common temperature for outbreaks 59°F to 77°F, below 50°F in spring
Ichthyobodosis, formerly Costia (<i>Ichthyobodo necator</i>)	very small protozoan ectoparasite, dangerous to young fish	Freshwater fish, and marine adapted salmonids, may be some marine fish	Attaches to skin or gills, causes tissue irritation, can lead to epithelial hyperplasia	formalin bath, potassium permanganate, salt bath (fresh water fish only)	causes disease over wide temperature range, 36°F to 86°F
Gill Maggot Disease (<i>Salmincola californiensis</i>)	copepod, infests gills of older salmonids in freshwater, can survive in salt water	salmonids and coregonids	attach on skin, fin base, in gill chamber, on gill filaments, oral chamber, causes hyperplasia, hypertrophy of gills	treatment with organophosphates, disinfection	copepod development is more rapid at warmer temperatures
Epistylis (<i>Epistylis</i> sp.)	protozoa, feeds on bacteria/other small organisms, use fish as surface for attachment	salmonids, bass, perch, catfish, many other warm water fish	attachment points are associated with bacterial infections of fins, jaws, gills, scales other hard calcified tissue	formalin, hydrogen peroxide and salt baths/ prolonged salt exposure, advanced cases may need treatment for systemic infection from	common in pond-raised fish in southern U.S. and elsewhere, especially during warmer months

Disease (Pathogen)	Organism Attributes	Species Affected	Pathogenesis	Treatment	Environmental Conditions Favorable to Disease
				associated bacteria	
Iridovirus (<i>Lymphocystivirus</i>)	virus is viable in water for about 1 week, incubation ranges from weeks to months	teleosts, such as bass, does not affect salmonids, catfish, cyprinids	infects dermal fibroblasts, causes large neoplastic hypertrophied cells	no treatment known, rarely causes mortality, fish can become severely disfigured	outbreaks occur after stress, handling or crowding.
Sturgeon Herpes Type 2 (<i>White Sturgeon Herpes Virus Type 2</i>)	Infects older sturgeon, mortality less than 10%	white sturgeon, shovelnose and pallid sturgeon infected experimentally	causes small white blisters, open lesions on body surface, lesions frequently infected with secondary pathogens	avoidance, treat infected fish for other parasites to reduce secondary infection in open lesions	unknown
Rosette Agent (Undescribed)	obligate intracellular fish parasite, may be new protozoan genus and species	Chinook and Atlantic salmon, brown and rainbow trout	causes severe anemia/ lymphocytosis, affects kidney, spleen	none known	none known
Infectious Pancreatic Necrosis (IPN) (IPN Virus)	birnavirus, only causes clinical illness in young fish <6 months old	rainbow, brook, cutthroat trout, coho, Atlantic, kokanee salmon, Arctic char.	primarily causes necrosis of pancreatic acinar cells, organs such as liver may become necrotic	disinfection, quarantine, raise fish in SPF water for first 6 months of life	mortality most rapid at water temperatures of 50° to 57°F, less mortality below and above this range

Source: Noga (2000), Woo (1995), Woo and Bruno (1999), Plumb (2002), Mendoza et al. (2002), pers. comm., Cox 2003.

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4.0 SP-F5/7 – EVALUATION OF FISHERIES MANAGEMENT ON PROJECT FISHERIES

4.1 COMMENTS RECEIVED VIA E-MAIL FROM ERIC THEISS TO TERRY MILLS, JULY 22, 2004

Please distribute these to the settlement and environmental working groups. Comments on F15 are attached.

NOAA Comments on Study Plan F5/7

Because this study plan and others will form the basis for NOAA's biological opinion, it is important to transmit our concerns about their content as early as possible. This does not include an exhaustive effects analysis, however it outlines at least some of the effects that should have been reported and will need to be analyzed to complete the biological assessment.

Section 6.1.2.1 is titled "Opportunities for fish in Lake Oroville to pass downstream". This section should be renamed to "Vectors for disease or genetic material to pass from non-anadromous to anadromous waters". This more accurately captures the goal and intent of the study plan. So renamed, one disease transmission vector is present at the hatchery intake, where a live or dead fish with disease or a pathogen attached to inorganic material could pass into the hatchery. Fish in the hatchery could acquire and potentially amplify the disease prevalence, and the disease could pass to the lower river as these fish are stocked out, either directly or as they return from the ocean as adults.

Although it has been asserted that live fish could not survive passage through the aeration tower at the hatchery, this has not been demonstrated, and in the absence of rigorous tests it must be assumed that fish can survive. The plumbing system of FRFH should be thoroughly described and evaluated for the potential for live or dead fish to pass through this system. If fish are able to pass through alive, it must be assumed that they could reproduce in the lower river.

Section 6.1.2.3 describes stocking that occurs in Thermalito Forebay, and concludes that "few rainbow trout would be expected to survive angling pressure, transit, and disease in order to potentially interact with ESA- and SSA-listed fish species in the Feather River." Study plan SP-F2 states "Myxosporeans are released back into freshwater following salmonid mortality, then the spores infect the polychaete" and "High mortalities have occurred in outmigrating juvenile Chinook salmon (PacifiCorp 2002)." These two factors alone suggest that the stocking of *O. mykiss* in these waters should be thoroughly reviewed at this time.

Additionally, the Study Plan states "the stocks of rainbow trout planted in Thermalito Forebay are not indigenous to the area and are highly susceptible to ceratomyxosis, a

nearly 100 percent fatal disease." Stocking out-of-basin O. mykiss in with close connectivity to anadromous waters presents a risk to the recovery of these species.

Although it may or may not be true that "few" O. mykiss would reach the Feather, either dead or alive, those that do could potentially pose a threat to the population of listed species. It appears likely that a diseased O. mykiss could transit though either the Afterbay (especially when seasonal temperatures are lower), pass though the hatchery intake into the hatchery or through the ladder, pass through the turbine at Thermalito dam, or pass downstream via spill. If alive, these fish could travel to prime spawning and rearing locations and propagate disease or genetic material from outside this basin.

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4.2 DISPOSITION OF COMMENTS TO SP-F5/7

The comments have been noted; no additional edits to this report are deemed necessary. Additional information covering the topics of disease and genetic introgression can be found in the reports resulting from study plans "*SP-F2 Evaluation of Project Effects on Fish Diseases*" and "*SP-F9 Evaluation of the Feather River Hatchery Effects on Naturally Spawning Salmonids*".

5.0 SP-F9 – EVALUATION OF THE FEATHER RIVER HATCHERY EFFECTS ON NATURALLY SPAWNING SALMONIDS

5.1 COMMENTS RECEIVED VIA E-MAIL FROM BOB BAIOCCHI TO TERRY MILLS, SEPTEMBER 30, 2004

(For a complete list of comments received from Bob Baiocchi see section 1.0)

Feather River Salmon and Steelhead Fish Hatchery Report – Randy Brown

Randy Brown is preparing a report for CDWR on the Feather River Salmon and Steelhead Fish Hatchery (aka Feather River Hatchery). At the subject meeting Mr. Brown stated that the report will be completed next week. Mr. Mills stated that following the completion of the report by Mr. Brown, it must be reviewed by staff members of DWR.

The subject Feather River Hatchery Report must be subject to comments by NOAA Fisheries and other parties, with a review period of at least 45 days.

Please forward a copy of said report by e-mail and also first class mail (hard copy) to me so that we will be able to submit written comments.

We reference the verbal representation by Randy Brown regarding the Feather River Salmon and Steelhead Fish Hatchery Report at the subject meeting.

Annual Fishery Agreement between NOAA Fisheries, Department of Water Resources, and Department of Water Resources

Please forward to me a copy of said annual 2004 fishery agreement (existing license) between NOAA Fisheries, Department of Water Resources, and Department of Water Resources.

Post Project Relicensing Fishery Agreement between NOAA Fisheries, Department of Water Resources, and Department of Water Resources

At the subject meeting a representative of the Department of Fish and Game advised the parties that I voted against the Post Project Relicensing Fishery Agreement between NOAA Fisheries, Department of Water Resources, and Department of Water Resources. I advised the parties that I have not reviewed said agreement.

I have reviewed my files and could not find a copy of said post project fishery agreement between the parties. I find it hard to believe that NOAA fisheries has developed a draft post project agreement without yet submitting recommendations to FERC and DWR. In my opinion, an agreement is a document that spells out the language (shall, will, may) and the duties and responsibilities of the parties.

Please forward a copy of said post project fishery agreement to me for our comments.

5.2 DISPOSITION OF COMMENTS TO SP-F9

The comments have been noted; no additional edits to this report are deemed necessary.

6.0 SP-F15 – EVALUATION OF THE FEASIBILITY TO PROVIDE PASSAGE FOR TARGETED SPECIES OF MIGRATORY AND ANADROMOUS FISH PAST OROVILLE FACILITY DAMS

6.1 COMMENTS RECEIVED VIA E-MAIL FROM ERIC THEISS TO TERRY MILLS, JULY 22, 2004

NOAA FISHERIES (National Marine Fisheries Service)
Comments on the California Department of Water Resources
Oroville Facilities Relicensing (FERC License No. 2100)
Study SP-F15

INTRODUCTION

NOAA Fisheries has been a regular participant in the FERC proceedings regarding the relicensing for the Oroville Facilities on the Feather River (License No. 2100). We first provided guidance to DWR on satisfying the mandates of the Endangered Species Act, the Magnuson-Stevens Fishery Management and Conservation Act, and the Federal Power Act (letters dated October 11, 2001 and December 5, 2002).

On May 28, 2003 we provided comments on the draft study plans submitted by DWR, highlighting the inadequacies we had noted in the proposed study plans. Attached to that document was an Attachment A - "NOAA Fisheries Goals and Objectives (FERC No. 2100)" which clearly outlines our interest in these proceedings, and asks for specific information. To date, in several key areas, the failure to address our concerns and requests are now hampering the process of developing a negotiated settlement.

This should not come as a surprise to anyone, nor should our move to avail ourselves of other avenues to ensure protection for our "public trust" responsibilities. A process which ignores, and appears to demean the stated information needs and requests of one or more of the parties, cannot succeed.

In general, NOAA Fisheries supports the use of collaborative settlements in FERC licensing proceedings, as this approach is more likely to result in a robust License application that reflects the interests of all the stakeholders.

However, we are concerned that in the absence of information, the Applicant may pursue a settlement based upon a generalized adaptive management scheme that defers mitigation to a later date and therefore, constitutes a defacto and indefinite extension of relicensing.

Adaptive management should be used to refine specific measures contained in the new license for this Project. Using an adaptive management scheme to defer information collection and basic licensing decisions until after the license is issued, is inappropriate.

We are also concerned that any settlement not rely on off-site mitigation as a means of addressing project impacts to aquatic resources. Proposed “protection, mitigation and enhancement” measures should directly reflect the on-site needs of NOAA trust resources.

MAJOR POLICY ISSUES

AUTHORITY/RESPONSIBILITY

- 1) NMFS (Secretary of Commerce) and the USFWS (Secretary of Interior) have fish passage prescription authority for Federal Power Act (Section 18) FERC License proceedings, and
- 2) DWR appears to believe that the recommendations of the CalFed Ecosystem Restoration Program - Strategic Core Plan Team recommendations (in which setting NMFS was at best one vote), should supplant our statutory authority in this area. We do not agree that our “Public Trust” responsibilities can be delegated to a committee of expert scientists, who have no authority, or responsibility for the action.

NMFS views its statutory responsibilities seriously, and has a national initiative to restore fish passage in these situations. We welcome the input and participation of the stakeholders, but cannot cede to them our authority (or the responsibility for the outcome), as the Federal Power Act does not allow us to delegate the authority.

PROJECT SCOPE/SCOPE OF HABITAT RESTORATION

- 1) NMFS has made it clear that our goal is the restoration of the historic salmonid habitat in the Central Valley, and as the opportunity arises we will pursue fish passage beyond previously deemed “terminal dams.”
- 2) DWR has argued, and continues to argue, that the benefits should be based on the project boundaries, and that since there is little or no suitable habitat within the project, fish passage should be dropped from consideration.

DWR does not appear to be willing to agree to language that would prescribe fish passage after access to more habitat is attained. Reference to our submittals on the Poe (P-2107), South Feather (P-2088) and Upper North Fork Feather River (P-2105) project files demonstrate see that a fish passage initiative is being pursued on a watershed level.

DWR argues that we should drop any opportunity for fish passage for the duration of their license renewal (50 years), which in turn would become the reason not to address the problems above Oroville, as the fish couldn't get to the other projects. Should DWR be willing to modify their position on a re-opener, we may have some room for further negotiations.

WATER TEMPERATURE/HABITAT SUITABILITY

NMFS has clearly established the historic salmonid use of the Feather River above Oroville. Clearly water temperatures were satisfactory, and presumably could again be so. We are prepared to assume that the existence of self-supporting populations of salmonids is a positive indicator for the survival of reintroduced anadromous salmonids.

DWR argues that water temperatures limit or preclude a salmonid reintroduction effort. The proposed water temperature study, conducted during the summer of 2004 (a Dry Year following a Dry Year), will be interesting, but hardly proof of a habitat limitation throughout the drainage.

- A brief study protocol needs to be presented to the collaborative for the study of thermal refugia. The study protocol should include the use of a GPS unit to determine the location of each thermograph. Video should be taken to clearly describe the aquatic and terrestrial habitat (including slope) of each location. Refugia need to be identified where these fish can over summer, including spring fed pools and tributary mouths.

Some of the thermograph data presented is inappropriate for inclusion into the report. For example, the logger at the mouth of Concow Creek (never assumed to be anadromous) is frequently inundated by Lake Oroville, therefore some of the data are actually lake water temperatures.

- All data which is not clearly known to be representative of salmonid habitat should be removed.

Although the water temperatures at some thermograph locations were higher than what is indicated as preferred by several authorities, much of this data was developed on

salmonids of the Pacific NorthWest. Although NOAA Fisheries generally asserts that these cooler temperatures are often most protective of listed species, data clearly shows that not all adult holding spring run Chinook salmon die at temperatures as high as 72.5 F in lower-elevation California habitat.¹ Salmonids are known to be able to tolerate even higher temperatures, especially near the margins of their range. We are very concerned about any loss of listed species, but if additional habitat (and salmonid production) could be gained with passage, NOAA Fisheries is required to investigate. We concur with the conclusion that "The presence of rainbow trout throughout the upper [middle?] Feather may indicate suitability for anadromous Chinook salmon and steelhead populations." Habitat at the higher, historically anadromous elevations are likely to be much more suitable.

GENETICS/HYBRIDIZATION

NMFS has been actively involved in the Salmonid genetic differentiation studies in California. We recognize the impacts of the operation of the Oroville Facilities (including the hatchery) on the Spring Run Chinook Salmon and Steelhead. As a result, our fish passage prescription will seek to help rectify the damage by providing isolation from hybridization and opportunity to reestablish genetic stocks more like the historical populations. We recognize this will take time, after all, it has taken time to create the problem. DWR appears to believe that having played a major role in the decline of the stocks on the Feather River, it should now use the damage as proof of the futility of attempting to correct the imbalance.

We need to keep two goals in mind, the State Water Projects need for a reliable source of water as authorized by the Burns-Porter Act, and the species restoration goals of the Endangered Species Act. If we can find common ground, we may be able to explore alternatives and define potential solutions.

In the end, both:

- the problems associated with the Oroville Facilities (and the fish hatchery) operation, and
- the maintenance and preservation of the stocks that still remain in the Feather River,

are in part due to the efforts of the CDWR and its efforts since the project was built. But we must also keep in mind, that the Oroville Facilities is operated today in a manner that

¹ Answer of Pacific Gas and Electric Company to Petition To Initiate Consultation Under the Endangered Species Act. Submittal to FERC under P-803, May 12, 2004.

is quite different than when it was first licensed. This is due in part, to the decision (made at the time the first long term power contracts were up for renewal) by CDWR, to operate as a utility. The most significant change was to the on-peak/off-peak nature of the operations. In addition, changes in the operation of the Feather River Hatchery have been instigated by CDWR.

- In response to our request for a full-feasibility analysis of fish passage, a study of the genetic impact of re-introducing anadromous salmonids can and should be rapidly produced using currently available information.

SCOPE OF STUDY

The stated objective of the study plan was to “consider a range of alternative methods and devices.” The report details variations on only one general option for downstream fish passage, the only one recognized for its potential by NOAA Fisheries at the time of study plan creation. It seems unreasonable to place the burden of exploring options solely upon relicensing participants, then expect the participants to be satisfied with the scope of the project for a 30 or even 50 year period. The goal of studies are to determine the best available scientific and technical information, not solely to satisfy participants. The resulting process has reduced the reasonable scope of potential passage solutions, as well as the credibility of the data collection and analysis.

Recently it has come to our attention that the a “Dry Dam” concept is being considering in fish passage studies in an adjacent watershed. For a downstream passage system of this type, the entire flow of the stream is screened during average or less than average flows and no water is ponded. During freshets, the dam gates are closed so that the release does not exceed the capacity of the screens. The dam is designed to capture the entire volume of the majority of freshets, so that in most cases all of the fish can be screened and transported downstream safely. In cases where freshets exceed the capacity of the dam and all fish are not screened, it would be anticipated that the project dam (in this case Oroville dam) would be spilling according to its flood control curve. This would likely provide for reasonable protection for the majority of listed species, and be commensurate with the natural variability in production numbers as experienced in wild populations.

- A dry dam option can and should be evaluated rapidly, and included within the study plan to provide input for settlement negotiations.

The F15 study plan suffered several unjustifiable delays, which have put participants with interests in the passage analysis at a disadvantage in the current negotiations.

This report often characterizes the geographic scope of the analysis as including the upper Feather river, however it is only briefly mentioned that the true scope is limited to the first upstream passage barrier. Although the study plan states “because the majority of this potential habitat lies beyond the geographic confines of this study plan (SP-F15), a separate feasibility evaluation will be performed in the cumulative effects analysis,” this study was never done and remains a prominent omission in our data analysis needs.

- Throughout the text, the geographic scope of the report should be more accurately characterized by referring to the middle Feather river, as opposed to the upper Feather river.

CHARACTERIZATION OF MODEL OUTPUT

Much of the results are centered upon the outcome of one variable in the model, however we assert that “the performance target of a 1:1 adult passed to adult return ratio” (Task 3, p. 6-37) was not collaboratively selected and should not be focused on. Regardless, if just one variable is changed only slightly, the ratio becomes greater than 1:1 (Table 1).

- The text should clearly describe the effect of a slight change in the “Juvenile Release to Adult Capture, Stream (%)” variables, and other variables as needed.

Table 1. Fish passage model showing slightly modified “Juvenile Release to Adult Capture, Stream (%)” value (bright green), from 0.46% to 0.92%. This parameter envelops expansive life history variables covering juvenile emigration from the Feather River to their return as adults to the hatchery ladder. The modification is well within the range of normally expected values. The technical feasibility of fish passage according to the “Adult Return to Adult Passed Ratio” (focused on in the text) is therefore surpassed.

Fishery User Input Values																		
Info	Reset Default Values			Boundary Value			User Modifiable Value			User Modified Value								
	Best Case	Expected	Worst Case	Best Case	Expected	Worst Case	Best Case	Expected	Worst Case	Best Case	Expected	Worst Case	Best Case	Expected	Worst Case			
Info	Model Output Totals			Total Habitat Accessed			Total Adults Passed			Total Juveniles Released			Total Returning Adults					
Info	Best Case	Expected	Worst Case	667276	2000	2000	628553	244988	141746	8297	2254	227						
	Adult Return to			Juvenile Release to			Adult Return to											
	Adult Passed Ratio			Adult Passed Ratio			Juvenile Release Ratio											
	4.15	1.13	0.11	314.28	122.50	70.87	0.01	0.01	0.00									
Spawning Potential				System Total			West Branch			North Fork			Middle Fork			South Fork		
	Best Case	Expected	Worst Case	Best Case	Expected	Worst Case	Best Case	Expected	Worst Case	Best Case	Expected	Worst Case	Best Case	Expected	Worst Case			
	Pre-spawn Mortality Survival Rate (%)			98%	95%	90%	98%	95%	90%	98%	95%	90%	98%	95%	90%			
	Redd Size (sf)			27	55	223												
	Egg Production Per Female			9500	5365	9369												
	In River Egg to Smolt Survival Rate, Stream (%)			13%	6%	3%	13%	6%	3%	13%	6%	3%	13%	6%	3%			
	In River Egg to Smolt Survival Rate, Ocean (%)			16%	9%	3%	16%	9%	3%	16%	9%	3%	16%	9%	3%			
Juvenile Collection																		
Low Tributary Flow - Screen	Proportion of Juvenile Capture (%)			95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%			
	Screen Capture Efficiency (%)			95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%				
High Tributary Flow - Gulper	In Reservoir Mortality Survival Rate (%)			98%	91%	80%	98%	91%	80%	98%	91%	80%	98%	91%	80%			
	Gulper Capture Efficiency (%)			19%	50%	21%	19%	50%	21%	19%	50%	21%	19%	50%	21%			
Juvenile Sorting and Tagging																		
	Sorting Efficiency (%)			98%	95%	90%	98%	95%	90%	98%	95%	90%	98%	95%	90%			
	% Juvenile Sized for PIT Tagging (%)			10%	50%	10%				10%	50%	10%	10%	50%	10%			
	% Appropriate Juvenile PIT Tagged (%)			10%	20%	10%												
	% Juvenile CWT Tagged (%)			98%	60%	10%												
Info	Tagging Survival Rate (%)			98%	97%	95%	98%	97%	95%	98%	97%	95%	98%	97%	95%			
	Holding Survival Rate (%)			98%	97%	95%	98%	97%	95%	98%	97%	95%	98%	97%	95%			
Downstream Juvenile Transport																		
	Emigration Period (days)			200														
	Barge Survival Rate (%)			98%	95%	70%	98%	95%	70%	98%	95%	70%	98%	95%	70%			
	Truck Survival Rate (%)			98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%			
Adult Immigration & Passage																		
	Immigration Period (days)			120														
	Juvenile Release to Adult Capture, Stream (%)			1.23%	0.02%	0.00%												
	Juvenile Release to Adult Capture, Ocean (%)			0.03%	0.23%	0.00%												
	Adult Holding & Sorting Survival Rate (%)			98%	97%	95%												
	Adult Trucking Survival Rate (%)			98%	96%	95%												
	Marina Adult Release Efficiency (%)			76%	50%	25%												

6.2 DISPOSITION OF COMMENTS TO SP-F15

The comments have been noted; no additional edits to this report are deemed necessary. Several comments are positional statements not directly related to the report and others are request for additional studies outside of the scope of work agreed to by the collaborative.

7.0 SP-W1 – PROJECT EFFECTS ON WATER QUALITY DESIGNATED BENEFICIAL USES FOR SURFACE WATERS

7.1 COMMENTS RECEIVED VIA E-MAIL FROM BOB BAIOCCHI TO TERRY MILLS, SEPTEMBER 30, 2004

(For a complete list of comments received from Bob Baiocchi see section 1.0)

Project Effects on Water Quality Designated Beneficial Uses for Surface Water; Study Plan W1

Before we can determine whether the many statements in the document are valid and also are in accordance with federal and state statutes and regulations, we must read the comments of NOAA Fisheries. NOAA Fisheries has a duty and responsibility to protect threatened and endangered spring-run salmon and steelhead trout species in the relicensing of the Oroville Project. Also NOAA Fisheries has a duty and responsibility to comply with the provisions of the US Fish and Wildlife Coordination Act. NOAA Fisheries must be given sufficient time by the licensee (DWR) to submit comments on the subject plan.

Once we read the comments of NOAA Fisheries, we request the opportunity to comment on said Plan under the public due process rights which is guaranteed under the US Constitution.

We reference Project Effects On Water Quality Designated Beneficial Uses For Surface Water; Study Plan W1; Oroville Facilities Relicensing; FERC Project 2100; Draft Final Report; September 2004; Prepared by Department of Water Resources.

7.2 DISPOSITION OF COMMENTS TO SP-W1

The comments have been noted; no additional edits to this report are deemed necessary.

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8.0 SP-T9 – RECREATION AND WILDLIFE

8.1 COMMENTS RECEIVED VIA E-MAIL FROM BRAD CORKIN TO TERRY MILLS, JULY 12, 2004

Terry:

I don't have an updated E-mail list for participants. Please forward my concerns electronically to the workgroup, and to myself, so I'll have the updated Email list electronically. Thx in advance for your help with this matter.

To the Environmental Workgroup regarding the Project concerns per the below letter and it's original attachment, DFRT-9.pdf., section **"5.6.3"**. (Note: Each section referenced from the attachment is copied below for your convenience as the pdf file is quite large.)

Of particular concerns are those study recommendations to the Afterbay and the proposed 5MPH speed limits in the North section.

"NO" WHERE in this document regarding the "Afterbay" was the effects of **"WATER LEVELS"** to animal habitat even mentioned! Only on page 88 (**"Impacts of Facilities and Factors Associated With Recreation Dams"**) for a Montana Bullfrog, is **"Water Level"** even mentioned in regards to its devastating effect to animal habitat during high-flow releases from said dam.

As also noted in the report, high speed boating, by "boats", has less of an impact than that of PWC's (**"Personal Watercraft Use"**). Lumping all "boats" into one category is "not" the solution. Until the effects of **WATER LEVELS** and it's effects on habitat are thoroughly studied, any decisions based on this collection of studies to limit its uses would/could be considered irresponsible! This is especially true with deviations up to 13 feet on a weekly or monthly basis.

A thorough study done properly by a non-interested party might even find it probable that the noise and wave action from all boats, even PWC's, keep the habitat back from the "low water level zones" of the Afterbay. This action, normally considered having a negative effect, may actually increase their nesting success since their nests are not flooded. Perhaps it would help explain why there is success in some of those areas of the Afterbay already...

Brad Corkin

Oroville Water Ski Club

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532-4103

Impacts of Facilities and Factors Associated With Recreation Dams

Researchers gathered information on the direct and indirect effects of a dam on the

foothill yellow-legged frog on the Trinity River in north-western California, from Lewiston Dam downstream to the confluence with the North Fork Trinity. Frog populations were studied following the dam construction and compared to pre-dam historical accounts. Habitat structure and the effects of flow releases were researched. Results showed a 94 percent loss of potential breeding habitat (bar habitat) and the creation of a deeper and narrower river channel that lacks habitat complexity. During the first two years of study, high flow releases destroyed all egg masses laid. Egg masses laid after the high flow release were also destroyed by a second flow release. Few larvae survived. During the last year of study, high-flow releases were done earlier in the year and a substantial proportion of egg masses and larvae survived. Two aspects of the dam were found to have the largest impact on the yellow-legged frog population; changes in river morphology due to controlled flows have resulted in loss of breeding habitat, and the timing of high-flow releases has caused the loss of entire cohorts. Researchers also suspect that the cool water temperatures artificially maintained during the summer for fish may retard the development of eggs and larvae. Controlled flows and lack of winter flooding may also create suitable habitat for the predatory bullfrog. (Lind et al., 1996)

Review of the impact of recreation on Montana wildlife found that any activity that results in reduced bank cover, decreased bank stability and erosion, or the destruction of houses, tunnels, feeding areas, and dryness of nests will detrimentally affect beaver, muskrat, and river otter. The main cause of these occurrences is the fluctuation of water levels associated with dams, as well as the recreational use supported by them. (Joslin and Youmans, 1999)

Personal Watercraft Use

Park staff at Glacier National Park, Montana, researched the environmental and social impacts of personal watercraft use on the lakes of the park. The use of PWC's has gained popularity, and park staff did not want to make it a common activity without researching its effects on the area. An informal analysis caused the park to place a temporary ban on PWC use pending completion of the park's general management plan in order to protect resources. (National Parks, 1996)

The effects of motor boats and personal watercraft on common terns were studied in New Jersey after experimenters noticed a decline in reproductive success of terns subjected to personal watercraft (PWC) disturbance. Observations were made of a nesting area near a boating channel. Disturbance was classified as by motor boat, by PWC with a seated rider, and by PWC with a standing rider; the reaction of the terns was then recorded. Terns reacted negatively to motor boats and PWC's, but the reaction was more severe when PWC's were near. Motor boats tended to obey posted speed limits; PWC's did not. Also, PWC's were able to go closer to shore than motor boats. Disturbance reaction was flight over the area. (Burger, 1998)

Researchers studied foraging and loafing waterbird responses to outboard-powered boats and personal watercraft to determine buffer distances that would minimize disturbance on the north- and west coast of Florida. Multiple areas of low, moderate, and high watercraft use were studied for two seasons; researchers created the disturbance with one of the two types of watercraft and recorded flush distance and

noise levels of the approaching vessel. When comparing flush distances from the two vessel types, data was pooled. Twenty-three species of birds were disturbed, including herons, pelicans, osprey, and terns. A comparison of the approaches by each vessel showed that 11 of 16 bird species reacted similarly to either disturbance, and only the great blue heron exhibited significantly larger flush distances in response to the PWC. The osprey and three other species exhibited significantly larger flush distances in response to the outboard motor. The results of this study for reaction to PWC's by non-nesting birds contrasts with those of a study on the reaction of nesting birds. Researchers suggest buffer zones of 180 m for wading birds, 140 m for terns and gulls, 100 m for plovers and sandpipers, and 150 m for ospreys. (Rodgers and Schwikert, 2002)

5.6.3 Measures Designed to Limit Recreation Related Impacts to Wildlife During Operations and Maintenance Activities

- Retain existing seasonal recreation closure in waterfowl nesting areas
- Restrict herbicide use in areas containing vernal pool or VELB habitat
- Abandon and revegetate or surface dirt roads adjacent to vernal pool habitats
- Limit bridge maintenance activities to the period from August 30 through February 1
- Limit to the extent practical, bridge inspections to the period between August 30 and February 1
- Maintain exclusionary fencing and gates on bridge inspection catwalks
- Implement Best Management Practices when conducting earthmoving, grading, levee maintenance, or culvert maintenance in areas containing vernal pools or VELB habitat
- Consider seasonal closure or consolidation of recreational use of campgrounds, day use areas, and other recreational facilities during low use periods
- Maintain and enforce the day use limitation within the OWA (excluding campground locations)
- Consider a restriction on boat speeds within the portion of the Thermalito Afterbay north of Highway 162 to limit disturbance of waterfowl
- Improve consultation and coordination between DFG, DWR, and the California Highway Patrol related to "special recreational event" planning at the Thermalito Afterbay and on the OWA.
- Restrict ORV use within the drawdown zone of Lake Oroville to minimize habitat degradation and wildlife disturbance/displacement

8.2 DISPOSITION OF COMMENTS TO SP-T9

The comments have been noted; no additional edits to this report are deemed necessary. Additional information that addresses water level effects on wildlife is contained in the report resulting from study plan "*SP-T1 Effects of Project Features and Operation on Wildlife and Wildlife Habitat.*"